WHAT IS CLAIMED IS:

1. A method for producing hydrogen comprising:

(A) reacting steam with a hydrocarbon feed stream in a heated regenerative reactor bed to produce hot synthesis gas and a cooled regenerative reactor bed, and cooling the hot synthesis gas in a gas cooler to produce cooled synthesis gas;

(B) passing the cooled synthesis gas through an adsorber containing adsorbent, adsorbing synthesis gas species other than hydrogen onto the adsorbent, and recovering hydrogen from the adsorber;

(C) desorbing adsorbed gas species from the adsorbent, and combusting the desorbed gas species with oxidant to produce hot combustion gas; and

(D) passing the hot combustion gas through the said cooled regenerative reactor bed to produce cooled combustion gas and said heated regenerative reactor bed.

2. The method of claim 1 wherein the steam is produced by heating water in a hot regenerative bed.

3. The method of claim 2 wherein the hot regenerative bed is produced by passing combustion gas therethrough after the said passage of the hot combustion gas through the cooled regenerative reactor bed.

4. The method of claim 1 wherein said heated regenerative bed is produced by catalytically combusting said desorbed gas species with oxidant in the cooled regenerative bed.

5. The method of claim 1 wherein the hot synthesis gas is passed through a furnace prior to the said cooling of the hot synthesis gas in the regenerative heat recovery bed.

6. The method of claim 1 wherein the hot synthesis gas is cooled by passing it through a regenerative heat recovery bed to produce cooled synthesis gas and a heated regenerative heat recovery bed.

7. The method of claim 1 wherein the adsorbed gases are desorbed from the adsorbent by passing purge gas through the adsorbent.

8. The method of claim 1 wherein the desorbed gases, prior to combustion, are heated in a heated regenerative heat recovery bed.

9. The method of claim 1 wherein the oxidant is a fluid having an oxygen concentration of at least 10 mole percent.

10. The method of claim 1 wherein a portion of water contained in the cooled synthesis gas in condensed in a second regenerative heat recovery bed.

11. The method of claim 1 where the cooled synthesis gas passed through a shift reactor to increase the concentration of hydrogen therein.

12. The method of claim 1 wherein a portion of water contained in the cooled synthesis gas is condensed in a second regenerative heat recovery bed at a first pressure and water is vaporized during the regeneration step at a pressure lower than the first pressure.